

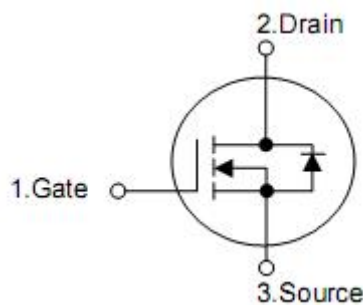
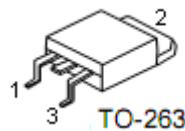
1. Description

This Power MOSFET is produced using KIA semi's advanced super-junction technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

2. Features

- n $R_{DS(on)}=0.27\Omega$ @ $V_{GS}=10V$
- n Low gate charge (typical 43nC)
- n High ruggedness
- n Fast switching
- n 100% avalanche tested
- n Improved dv/dt capability

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

4. Absolute maximum ratings

(T_C= 25 °C , unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-source voltage	V _{DSS}	650	V
Gate-source voltage	V _{GSS}	±30	V
Drain current continuous	I _D	T _C =25°C	15
		T _C =100°C	9.4
Drain current pulsed (note1)	I _{DM}	45	A
Avalanche energy	Repetitive (note1)	E _{AR}	0.32
	Single pulse (note2)	E _{AS}	110
Avalanche energy(note1)	I _{AR}	2.1	A
Peak diode recovery dv/dt (note3)	dv/dt	5.0	V/ns
Total power dissipation	P _D	T _C =25 °C	156
		derate above 25 °C	1.67
Operating and storage temperature range	T _J , T _{STG}	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T _L	300	°C

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, Junction-ambient	R _{thJA}	62	°C/W
Thermal resistance, case-to-sink typ.	R _{thJS}	0.5	°C/W
Thermal resistance, Junction-case	R _{thJC}	0.6	°C/W

6. Electrical characteristics

($T_C=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=480V, T_C=125^\circ\text{C}$	-	-	10	μA
Gate-body leakage current	Forward	I_{GSS}	-	-	100	nA
	Reverse				-100	nA
Breakdown voltage temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to 25°C	-	0.6	-	$V/^\circ\text{C}$
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	-	4.5	V
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=7.5A$	-	0.27	0.3	Ω
Forward transconductance	g_{FS}	$V_{DS}=40V, I_D=7.5A$ (note4)	-	16	-	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$	-	800	-	pF
Output capacitance	C_{oss}		-	180	-	pF
Reverse transfer capacitance	C_{rss}		-	8	-	pF
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD}=400V, I_D=6.5A,$ $R_G=20\Omega$ (note4,5)	-	13	-	ns
Rise time	t_r		-	11	-	ns
Turn-off delay time	$t_{d(off)}$		-	100	-	ns
Fall time	t_f		-	12	-	ns
Total gate charge	Q_g		$V_{DS}=480V, I_D=6.5A,$ $V_{GS}=10V$ (note4,5)	-	43	-
Gate-source charge	Q_{gs}	-		5	-	nC
Gate-drain charge	Q_{gd}	-		22	-	nC
Drain-source diode characteristics and maximum ratings						
Drain-source diode forward voltage	V_{SD}	$V_{GS}=0V, I_{SD}=6.5A$	-	-	1.5	V
Continuous drain-source current	I_S		-	-	12	A
Pulsed drain-source current	I_{SM}		-	-	40	A
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_{SD}=6.5A$ $di_F/dt=100A/\mu s$ (note4)	-	345	-	ns
Reverse recovery charge	Q_{rr}		-	4.5	-	μC

Note:1. repetitive rating: pulse width limited by maximum junction temperature

2. $I_{AS}=2.1A, L=50mH, V_{DD}=150V, R_G=25\Omega$, starting $T_J=25^\circ\text{C}$

3. $I_{SD}\leq 10A, di/dt\leq 200A/\mu s, V_{DD}\leq BV_{DSS}$, starting $T_J=25^\circ\text{C}$

4. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

5. Essentially independent of operating temperature typical characteristics.

Typical Characteristics

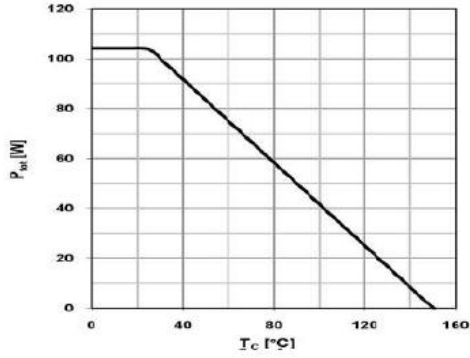


Figure 1. Power Dissipation

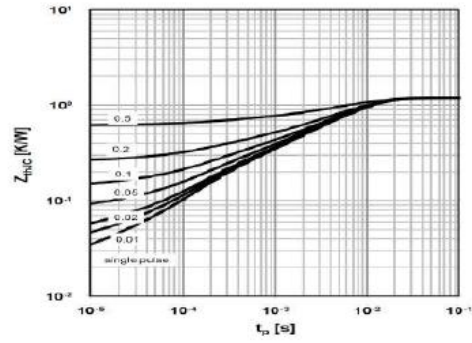


Figure 2. Transient Thermal Response Curve

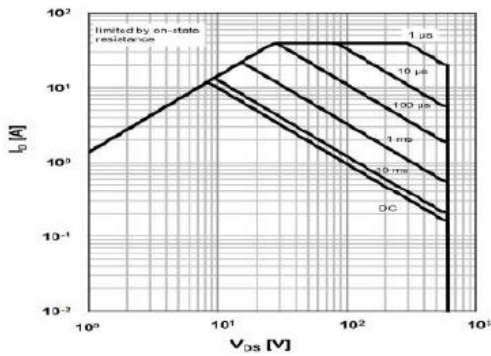


Figure 3. Maximum Safe Operating Area for @25°C

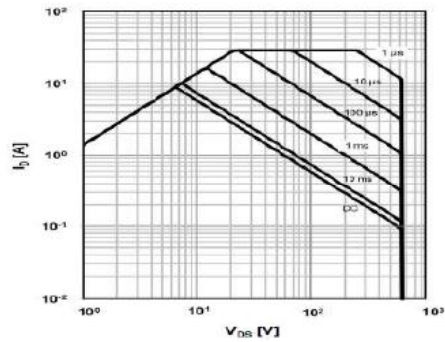


Figure 4. Maximum Safe Operating Area for @80°C

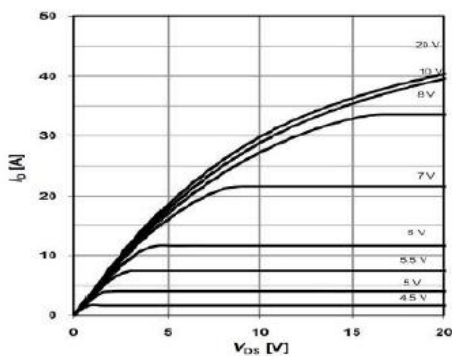


Figure 5. Output Characteristics@25°C

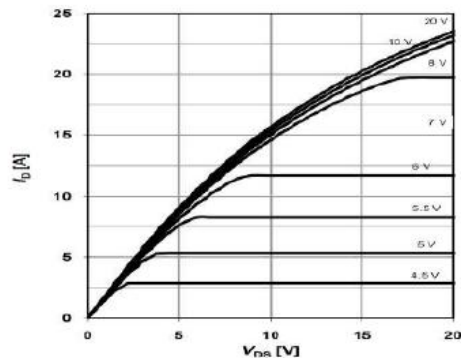


Figure 6. Output Characteristics@125°C

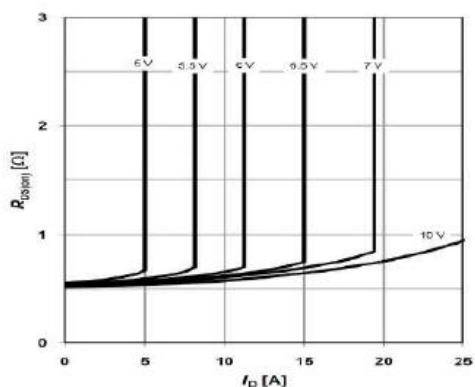


Figure 7. On-Resistance Variation vs Drain Current and Gate Voltage@125°C

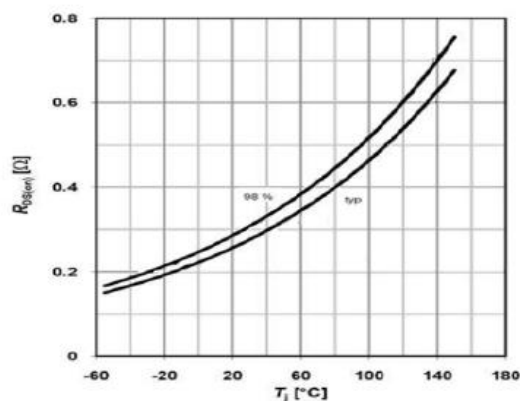


Figure 8. On-Resistance Variation vs Temperature

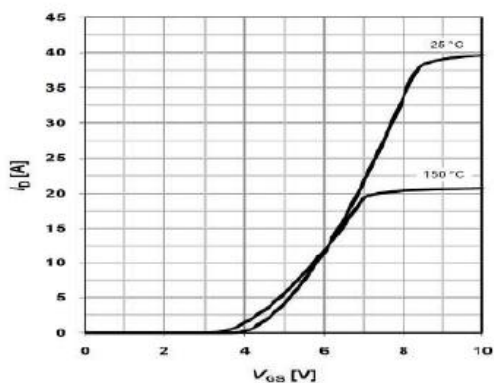


Figure 9. Transfer Characteristics

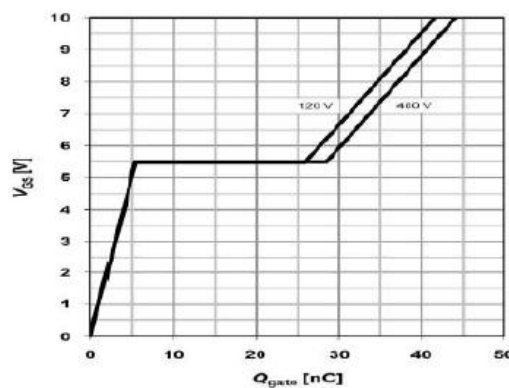


Figure 10. Gate Charge Characteristics

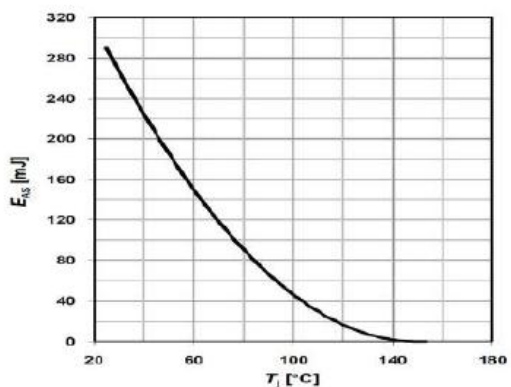


Figure 11. Avalanche Energy Characteristics

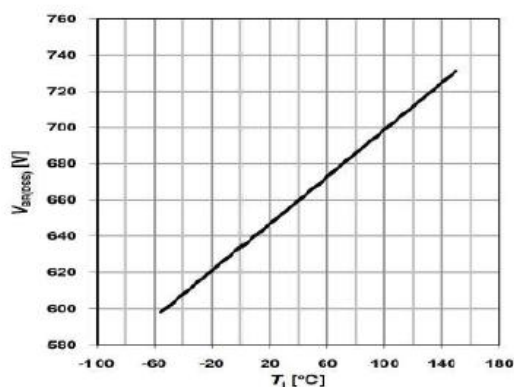


Figure 12. Breakdown Voltage Variation vs Temperature

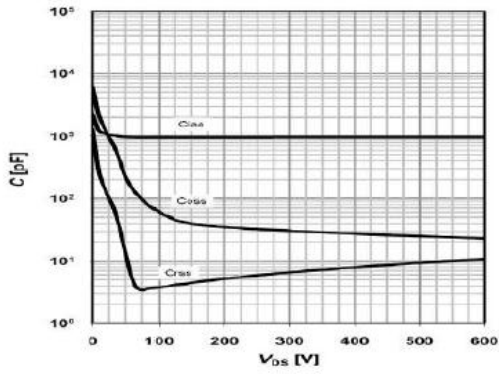


Figure 13. Capacitance Characteristics

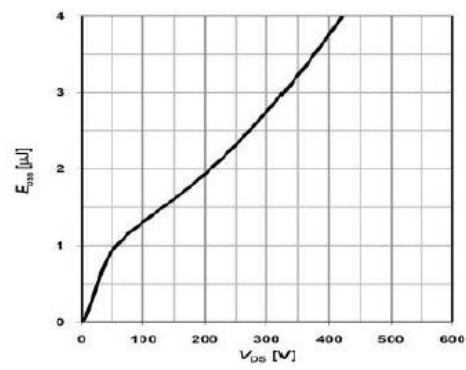


Figure 14. On-Resistance Variation vs Temperature

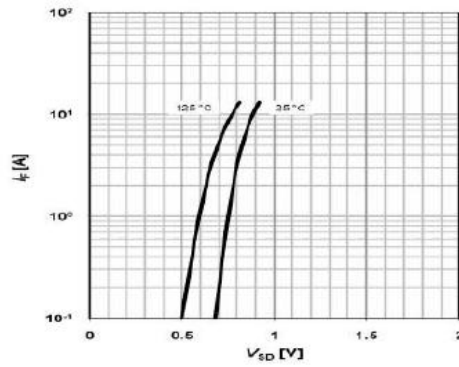


Figure 15. Body Diode Forward Voltage Variation with Source Current and Temperature